REMARKS

Claims 1-17, 21, 22, 24, 25, 30, 31 and 39-42 are presented for consideration, with Claims 1, 15, 21, 22, 24, 25, 30 and 31 being independent. Claims 1, 15, 21, 22, 24, 25, 30 and 31 have been amended to even further clarify certain features of Applicant's invention. Support for claim amendments can be found in the original specification including, for example, at page 25, lines 3 to 4. As such, no new matter has been added.

Claims 1-17, 21, 22, 24, 25, 30, 31 and 39-42 stand rejected under 35 U.S.C. §102 as allegedly being anticipated by Adobe PDF 1.4 Specification (Adobe). Applicants submit that the cited art, whether taken individually or in combination, does not teach or suggest many features of the present invention, as previously recited in these claims. Therefore, this rejection is respectfully traversed. Nevertheless, Applicants submit that amended independent Claims 1, 15, 21, 22, 24, 25, 30 and 31, as presented, amplify the distinctions between the present invention and the cited art.

Claim 1, as amended, recites a computer-implemented method of representing an amount of image color in a composite image. The method includes a step of generating at least one additional opacity channel for use in creating the composite image. The additional opacity channel is initially set to fully opaque to represent that all of the image color is visible. The method also includes the steps of compositing at least one graphical object having object color and object opacity, with an image having image opacity and the image color, to create the composite image, the composite image having composite image color and composite image opacity, the composite image color and composite image opacity being derived from one or more of the object color, the object opacity, the image color and the image opacity, and compositing

the object opacity with the additional opacity channel to update the additional opacity channel.

The updated additional opacity channel is thereby less than fully opaque and represents an amount of the image color remaining in the composite image following the compositing of the at least one graphical object with the image. The method also includes a step of storing at least the updated additional opacity channel in a computer-readable memory. The steps are performed on a processor.

Independent Claims 15, 21, 22, 24, 25, 30 and 31 have been amended in a substantially similar manner as amended Claim 1.

In the present invention, as set forth in the amended independent claims, an additional opacity channel is initially set to fully opaque. Further, a graphical object is "partially transparent." As a consequence of compositing steps, the updated additional opacity channel, which represents an amount of the image color remaining in a composite image after compositing the partially transparent graphical object with the image, is thereby less than fully opaque. The Office Action relies on Chapter 7, entitled "Transparency," of Adobe to teach, *inter alia*, compositing the object opacity with the additional opacity channel to update the additional opacity channel, as set forth in Claim 1. The updated additional opacity channel represents an amount of the image color remaining in the composite image following the compositing of the at least one graphical object with the image.

Additional Opacity Channel

It appears that the Examiner is relying on q_r or, alternatively, q_i to teach the claimed "additional opacity channel." Applicants assume that this is what is meant by the notation

"q_r/q_i," used by the Examiner on page 3, line 2, of the Office Action. On page 423, q_r, is defined by Adobe as "Result opacity." Page 427 of Adobe defines q_i, as "Result opacity after compositing object *i*." Applicants submit, however, that neither q_r nor q_i represent an amount of the image color remaining in a composite image after compositing a graphical object with the image. Rather, both of the opacity values q_r and q_i are the result of a compositing operation of backdrop and source values.

Applicants are not asserting that it is because opacity values q_r and q_i are "resultant values" that those values do not teach the additional opacity channel. Rather, it is because the opacity values q_r and q_i are resultant values of a composition operation of backdrop and source values that those values do not teach the additional opacity channel. The additional opacity channel represents an amount of an image color remaining in a composite image after compositing a graphical object with the image, and neither q_r nor q_i represent such a value.

As noted by the Examiner on page 11 of the Office Action, the process of group compositing is iterative (q_i, i = 1, ..., n), and the result opacity q_r is updated until a final opacity is reached. As result opacity q_r is updated, however, there is no value which represents an amount of an image color remaining in a composite image after compositing a graphical object with the image. Accordingly, Adobe fails to teach or suggest the additional opacity channel, which represents an amount of an image color remaining in a composite image after compositing a graphical object with the image, of the present invention.

The Office Action, on the middle page 11, states "Regarding the opacities, the claim requires compositing an object opacity and an image opacity, and compositing the object opacity with an additional opacity channel to update the opacity channel." This statement, however, does

not accurately represent or fairly reflect the claimed features of Applicants' invention.

The method of Claim 1 refers to the following opacities: (1) object opacity, (2) image opacity, (3) composite image opacity, and (4) the additional opacity. Applicants submit that the Office Action does not correlate the opacities of Adobe to the opacities set forth in the claims of the present invention. For example, on page 3 of the Office Action, the same sections of Adobe relied on to teach a composite image opacity compositing step are also relied on to teach an additional opacity channel compositing step (section 7.2.5 on page 419 and the first two paragraphs on page 423). As such, it appears that the Examiner is relying on the same opacity values to teach a composite image opacity and an additional opacity, as set forth in Claim 1.

As set forth in the claims, however, the composite image opacity and the additional opacity are not the same. The composite image opacity is created by compositing a partially transparent graphical object with an image. The additional opacity is updated by compositing the object opacity, partially transparent graphical object, with the additional opacity, which is originally set to be fully opaque. While Adobe may discuss, beginning on page 428, accumulating the opacity of composited group elements, Adobe does not disclose an additional opacity channel representing an amount of original image colour remaining after such compositing. The distinction between Adobe and the present invention can be demonstrated by the following worked example.

Worked Example 1

Suppose a series of objects with opacities of 0.25 and 0.5 are composited in sequence within a group of objects. As set forth in the amended independent claims, the additional opacity

channel is initially set to fully opaque to represent that all of the image color is visible. As such, according to the present invention and the corresponding detailed description, the formula for determining the amount of original image remaining are:

$D_a(d)$ = fully opaque (see page 25, lines 3-4)

$D_a(d)' = D_a(d)\ (1 - s_a)$ (see page 23, Table 2, row OVER, and page 25 lines 19-23)

Based on the example object opacities, the following sequence of values are calculated:

$D_a(d) = 1$ (the additional opacity channel being initially fully opaque)

$D_a(d)' = 1\ (1\text{-}0.25) = 0.75$

$D_a(d)'' = 0.75\ (1\text{-}0.5) = 0.375$

The result above for the present invention can be compared to Adobe's formula for calculating the results of group compositing functions for opacity, as set forth on page 430, which is:

$a_{gi} = \text{Union}\ (a_{gi}\text{-}1, a_{si})$

where $a_{g0} = 0$

where Union (b, s) = b + s - (b x s) (see Adobe page 423, top of page).

Using the example series of objects and opacities noted above, the calculated sequence of values from Adobe's formula would be:

$a_{g0} = 0$

$a_{g1} = \text{Union}\ (0, 0.25) = 0 + 0.25 - (0 \times 0.25) = 0.25$

$a_{g2} = \text{Union}\ (0.25, 0.5) = 0.25 + 0.5 - (0.25 \times 0.5) = 0.625$

As can be seen from these calculations, the resulting sequence of opacity values from Adobe's formula are clearly different and cannot represent the proportion of original background remaining. The formula of the present invention gives an opacity result of 0.375, whereas the

formula of Adobe gives a result opacity of 0.625. As such, the opacity compositing operations of Adobe are not the same as the present invention's step of compositing an object opacity with an additional opacity channel to update the additional opacity channel. Accordingly, Applicants submit that Adobe fails to teach compositing an object opacity with an additional opacity channel to update the additional opacity channel, the updated additional opacity channel thereby being less than fully opaque and representing an amount of the image color remaining in the composite image following the compositing of the at least one graphical object with the image.

Examiner's Response to Arguments

In the Response to Arguments section of the Office Action, the Examiner states, in the middle of page 12, that a 100% opaque object composited with a 50% opaque object will not result in a 100% composited opacity. Applicants submit, however, that this statement is not supported by Adobe. On page 423 of Adobe, at the end of the second paragraph, discussing how result shape and result opacity are computed based on a union function, Adobe states: "The result tends toward 1.0: if either input is 1.0, the result will be 1.0." As such, Adobe directly contradicts the assertion that a 100% opaque object composited with a 50% opaque object will not result in a 100% composited opacity.

Accordingly, Applicants assert that the counter example, as presented by Applicants on page 14 of the Amendment filed September 21, 2009, is valid. That is, an image with 50% opacity, composited with a fully opaque background, does indeed produce a fully opaque result. Adobe's normal background opacity channel, therefore, does not represent the amount of background remaining. In further support of this contention, the Examiner is requested to

consider the following example.

Worked Example 2

In this example, a simplified situation in which entire pixels are covered will be examined. Entire pixels may be covered, for example, away from object boundaries. Adobe's formula for result opacity is:

$q_r = \text{Union}\,(f_b \times q_b, f_s \times q_s) / f_r$ (see Adobe page 423, middle of page)

where $\text{Union}\,(b, s) = b + s - (b \times s)$ (see Adobe page 423, top of page).

In a simplified situation in which entire pixels are covered, e.g., away from object boundaries, and shape values $f_b = f_s = f_r, = 1$. This is also the case for elementary objects, as discussed on page 421 of Adobe. In such a case:

$q_r = \text{Union}\,(q_b, q_s) = q_b + q_s - (q_b \times q_s)$

Suppose first that both the initial background and the composited object are opaque. In that case, $q_b = q_s = 1$. The resultant background opacity is then:

$q_r = 1 + 1 - (1 \times 1) = 1$ i.e., fully opaque.

In other words, when the background is fully occluded and no part of the background remains, then $q_r = 100\%$.

Now, consider the situation where the initial background is opaque (i.e., $q_b = 1$), and the composited object is only 50% opaque (i.e., $q_s = 0.5$). Then the resultant background opacity, using Adobe's formula is:

$q_r = 1 + 0.5 - (1 \times 0.5) = 1$ i.e, also fully opaque.

In other words, when the background is only partially obscured and a significant part of the

background remains visible, the $q_r = 100\%$. Therefore, there is no correlation between the normal background opacity channels and the amount of original background remaining after compositing. As such, the Office Action cannot rely on those opacity channels to teach the additional opacity channel of the present invention, as set forth in Claim 1.

Summary

Finally, the Examiner's suggests that the regular background opacity channel can perform the same function of the claimed additional opacity channel. Applicants disagree. If, for example, the initial background is fully transparent, then the sequence of values calculated is the same as in Adobe's accumulated object opacity, viz, 0, 0.25, 0.625. If the initial background is fully opaque, then the sequence of value calculated is 1, 1, 1. In neither case can this be seen to represent the proportion of original background remaining.

On the other hand, the presently claimed invention, as recited in Claim 1, already has a resulting opacity from a compositing operation. Object opacity and image opacity are composited to determine a composite image opacity. The composite image opacity, however, is not the same as the updated additional opacity, as the additional opacity channel represents an amount of the image colour remaining in the composite image, following the compositing of the object and the image. Applicants submit, therefore, that Adobe fails to teach or suggest at least the steps of generating at least one additional opacity channel and compositing the object opacity with the additional opacity channel to create an updated opacity channel, as set forth in Claim 1 of Applicant's invention.

The remaining independent claims, i.e., Claims 15, 21, 22, 24, 25, 30 and 31, can also be distinguished over Adobe for substantially the same reasons. Accordingly, it is submitted that Adobe fails to teach or suggest Applicant's invention as set forth in Applicant's claimed invention. Therefore, reconsideration and withdrawal of the rejection of the claims under 35 U.S.C. §102(b) are respectfully requested.

Thus, it is submitted that Applicants' invention as set forth in independent Claims 1, 15, 21, 22, 24, 25, 30 and 31 is patentable over the cited art.

In addition, dependent Claims 2-14, 16, 17 and 39-41 set forth additional features of Applicants' invention. Independent consideration of the dependent claims is respectfully requested.

Applicants respectfully request entry of the above amendments as they are being presented in an earnest effort to place this application in condition for allowance. The amendments were not presented earlier as Applicants had been of the belief that the previously pending claims were allowable over the art of record.

Applicants respectfully submit that all outstanding matters in the above application have been addressed and that this application is in condition for allowance. Favorable reconsideration and early passage to issue of the above application is respectfully sought.

Applicants' undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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